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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney
DocketNo.

81230.55US1

First Inventor:

Hayes, Patrick

Title

CONSUMER ELECTRONIC NAVIGATION
SYSTEM AND METHODS RELATED THERE

Express Mail Label
No.

EI248899756US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ *Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 34]
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R&D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 133) [Total Sheets 14]
4. Oath or Declaration [Total Pages 3]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s)
named in the prior application, see 37 C.F.R. §§
1.63(d)(2) and 1.33(b).

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A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.37), EXCEPT IF ONE FILED
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5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
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 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☐ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
9. ☐ English translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☐ Preliminary Amendment
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16. ☐ If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

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Prior application information: Examiner _____ Group/Art Unit: _____

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July 6, 2000

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Re: Utility Patent Application
Title: Consumer Electronic Navigation System and Methods Related
Thereto
Docket #: 81230.55US1

Dear Sir:

Enclosed for filing in the U.S. Patent and Trademark Office is the above-referenced patent application:

- 1) Utility Patent Application transmittal
- 2) Fee Transmittal in duplicate
- 3) Specification (34 pgs.)
- 4) Formal drawings (14 pgs.)
- 5) Declaration and Power of Attorney (2 pgs.)
- 6) Check # 200877 in the amount of \$831.00
- 7) Postage prepaid return postcard

Respectfully submitted,

John E. Hyatt
For Alzheimer & Gray
Registration No. 43,421

Enclosures

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STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & 1.27(c))—SMALL BUSINESS CONCERNDocket Number (Optional)
81230.55US1Applicant, Patentee, or Identifier: Hayes, et al.Application or Patent No.: Not assignedFiled or Issued: Concurrent herewithTitle: CONSUMER ELECTRONIC NAVIGATION SYSTEM AND METHODS RELATED THERETO

I hereby state that I am

- ☐ the owner of the small business concern identified below:
- ☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN Universal Electronics Inc.ADDRESS OF SMALL BUSINESS CONCERN 6101 Gateway Drive, Cypress, California 90630-4841

I hereby state that the above identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office. Questions related to size standards for a small business concern may be directed to: Small Business Administration, Size Standards Staff, 409 Third Street, SW, Washington, DC 20416.

I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

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- ☐ the application identified above.
- ☐ the patent identified above.

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NAME OF PERSON SIGNING Richard A. Firehammer, Jr., Esq.TITLE OF PERSON IF OTHER THAN OWNER Sr. Vice President and General CounselADDRESS OF PERSON SIGNING 8190 Carrington Place, Bainbridge Township
Chagrin Falls, OH 44023SIGNATURE DATE 6/28/00

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**APPLICATION FOR
UNITED STATES LETTERS PATENT**

Be it known that we, Patrick H. Hayes of Mission Viejo, CA; and John E. Hyatt of Palos Park, IL; have invented a new and useful "Consumer Electronic Navigation System and Methods Related Thereto."

TITLE

Consumer Electronic Navigation System and Methods Related Thereto

FIELD OF THE INVENTION

10 This patent relates to consumer electronics with particular embodiments featuring remote controls.

BACKGROUND OF THE INVENTION

Modern digitally encoded media such as digital video discs (DVDs) typically include
15 additional interactive material over and above the basic video program or movie. Examples of this additional interactive material include “behind the scenes” footage, commentary, special effects and the like (i.e., secondary material). This additional material is accessed using a remote control to navigate a series of menu choices, either directly from within the main show (i.e., the primary material) or from an initial starting screen. In either case,
20 however, the structure of the menu tree and the quantity and nature of the choices offered are defined by data on the removable media, and not on the playback hardware, i.e., the DVD player when discussing DVDs. Further, the format of the digital medium is predetermined and generally standard to be operable on a multitude of players by various manufacturers.

25 Accordingly, the sequence of remote control keystrokes required to access a “chapter” directly, to view additional information about a particular scene, to obtain a biography of a

5 cast member, etc., varies from disc to disc though the format, such as the table of contents
location on the disc may (or may not) be standard. In previous consumer electronic systems
menu choices were largely predetermined by the playback hardware. This was satisfactory
because most media did not have secondary material and thus, a fixed menu format was
adequate. However, in the case of newer digitally encoded media, the keystrokes necessary
10 to access any given feature or set of features will change from disc to disc (i.e., from
removable digital media to removable digital media).

For example, in the currently specified DVD-video format, the content of a disk is
made up of titles (each title being a major division of disk content such as a movie, feature,
15 album, etc.) and chapters (parts of movies, songs, etc.). A typical movie DVD thus might
include the movie itself, a theatrical trailer and actor biographies as three separate titles, with
the long movie and the biographies further subdivided into chapters for direct access to
particular sections. Almost all disks will include a main menu from which the desired title
is selected. Each title can then also have a title menu, and if required, additional sub-menus.
20 Each menu page display consists of a single-frame graphic (in fact, limited motion is possible
in some areas) overlaid with up to 36 highlightable rectangular "buttons." These menus
are navigated using four "arrow keys" and a "select" button on the remote control. The exact
number, position, and function of the "buttons" on each page and the way in which the
various menu pages are linked together is entirely under the control of the producer of the
25 disc. The definition of each button includes four directional links to up to four other buttons
on the screen corresponding to four arrow buttons on the remote control. Conventional

5 remotes do not support more than four directions. This limits the links a disc producer can
tie to any given mode. These links are not, however, required to correlate the physical layout
of the buttons to a corresponding directional position displayed on screen -- so complex
networks of navigational relationships are possible. Also, while access to additional
functions such as freeze, step, scan, camera angle select, etc., may be generically supported
10 by the DVD player's remote control system, these features may be selectively enabled and
disabled by the producer of the disc. (Note, for example, that many DVD movie discs will
not allow the viewer to "fast forward" or skip past the opening FBI warning screen.)
Therefore, it is no longer practical for a user to program frequently used operations onto a
single key in the form of fixed sequences of commands (e.g., so called "macro" functions as
15 described in U.S. Patent No. 5,959,751, incorporated herein by reference, and others). Other
patents and applications of interest, which are particularly relevant to remote control
technology and are incorporated herein by reference, include U.S. Patent Nos. 5,515,052;
5,414,426; 5,255,313; and U.S. Patent Application Serial No. 09/418,091 filed October 14,
1999.

20

Pat. '052 discloses a universal remote control with function synthesis. The remote
control comprises driver circuitry for communicating code signal generation sequences
including a code generated command signal followed by a code setting signal; and memory
for storing information therein. Pat. '426 discloses a favorite key macro command and
25 chained macro command in a remote control. The remote control comprises an
entry/definition program and memory for enabling a user of the remote control to define a

5 macro for selecting at least one favorite channel by entry of a series of keystrokes on the keyboard. The remote also includes a playback program in memory for enabling an operator to affect rapid selection of at least one favorite channel of the consumer electronic device to be controlled upon subsequent depression of the macro key. Pat. '313 discloses a universal remote control system having a signal generator to transmit signals which will cause specific
10 functions to occur in specific controlled devices. Pat. App. Ser. No. '091 also discloses means and methods for operating a remote control.

The present invention improves on device, channel and menu control, and navigation associated with the prior art.

15

SUMMARY OF THE INVENTION

Most users of playback hardware are familiar with a function known as "previous channel" key which, when viewing a television (TV) provides, for example, a means for a direct return to the channel number last viewed. It would thus be advantageous if it were
20 possible to offer a similar feature which allowed the user to return to the last point visited in a menu tree via minimal keystrokes, and preferably with a single keypress. This could be achieved if, for example, the remote control stored the last sequence of menu navigation keystrokes used and was capable of playing these keystrokes back at the press or activation of a single button. (For convenience, this "single key" will generally be referred to as the
25 "JUMP" key throughout the rest of this document, although clearly other labels may be used for this key and function as well.)

5 Since a user might choose to interleave other operations (e.g., volume adjustments) between navigation keystrokes, the user interface (preferably incorporated in a remote control) preferably identifies and stores only those key operations related to the, e.g., DVD, menu navigation. All other keystrokes (including non-navigational and menu navigation keystrokes directed towards other devices) are discarded, or filtered. This filtering could also
10 occur anytime prior to when transmission of the unwanted signal would occur. The remote control should, in preferred embodiments, also accurately identify the start and end point of each sequence performed to reproduce only the series of commands corresponding to the last menu operation performed.

15 Accordingly, the present invention provides a consumer electronic system comprising a consumer electronic device; a removable digital medium; and a control module. The consumer electronic device may generally comprise any appliance, but is preferably a media device, and, in particular, a digital media player. The removable digital medium, which is operable with the consumer electronic device, has a menu system stored thereon. Preferably
20 the menu system includes a visual display graphically presenting selections, or options, etc. The control module has navigation keys for navigating the menu system when the digital medium is operating with the consumer electronic device. The control module acts as (or incorporates) a user interface and is preferably a hand held device. In preferred embodiments, the user interface is in a remote control. The control module further includes
25 means for storing a sequence of navigation keystrokes of at least two of the navigation keys and means for repeating the sequence of navigation keystrokes with fewer keystrokes than

5 the sequence contains. The digital medium is preferably a digital video disc or a digital memory card, though other storage mediums will be apparent to those of skill in the art.

Another embodiment of the invention is directed toward a remote control operable with a consumer electronic device and a removable digital medium. The remote control
10 comprises navigation keys; storage means for storing a sequence of navigation keys; and means for repeating the sequence.

Another embodiment of the invention is directed toward a remote control operable with a consumer electronic system having a consumer electronic device and a removable
15 digital medium including a menu system. The remote control comprises a plurality of keys including navigation keys for navigating the menu system and a transmitter, preferably an IR transmitter, providing communications between at least one of the keys and the consumer electronic device. Means for storing a sequence of navigation keys and means for executing the sequence with less keystrokes than contained in the navigation keystrokes is also
20 provided. The means for storing preferably includes programming and memory, though may also include circuitry. It will be understood that programming and circuitry are generally interchangeable, particularly with use of embedded microcontrollers. Therefore, “programming” and “circuitry” are often used interchangeably. The sequence is preferably stored in a sequence table in memory. The executing means, likewise, comprises
25 programming and/or circuitry.

5 In accordance with the teachings of this invention, a method of navigating secondary material provided on a removable digital medium is provided. The secondary material may, for example, be additional interactive material over and above the basic video program or movie, e.g., in addition to the primary material. A sequence of navigation keys is stored and subsequently executed with fewer keystrokes than contained in the sequence. The secondary
10 material is preferably navigated (subsequently, i.e., navigated again) upon operation of a single key.

Another embodiment of the invention is directed toward accessing material provided on a removable digital medium. A digital media player accesses the removable digital
15 medium; and a control module controls the digital media player and has the capability of storing steps for accessing desired material provided on the removable digital medium. Preferably a user is allowed to store the steps for accessing the desired material. The control module preferably has the capability of accessing the desired material with a reduced step process, preferably a single key, subsequent to the step of storing steps for accessing the
20 desired material. The user is thus allowed to access the desired material initially provided on the removable digital medium. The desired material may be accessed directly from the medium, from storage in the player or from other compatible components.

Another embodiment, also directed toward enhancing the user interface, includes a
25 remote control having a display and means for defining keys (more generally images/graphics) on the display based upon information transmitted to the remote control.

5 In one embodiment, the navigation keys are designed to operate with more than four links per node. In a preferred embodiment, a display screen is modified to match the number of navigation keys to the number of links per a given node. Further, in combination or in the alternative, command sequences may be generated based upon the information on the medium. The command sequences (e.g., navigation sequences) may be preprogrammed and
10 stored on the medium for later transmission to the remote control or the remote control may have programming for generating sequences based upon, and customized to, information stored on the medium.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Fig. 1 depicts a consumer electronic system including a control module having navigation keys.

Fig. 2 depicts an enlargement of the navigation keys shown on the remote control of Fig. 1.

20 Fig. 3 shows a flowchart representing one method of storing and playing back a sequence of navigation keys.

Fig. 4 shows a flow chart representing a method of adding a key to a stored sequence.

25

5 Figs. 5(a)-5(d) show changes to a key sequence table as keys in a sequence are stored in the table.

Fig. 6 shows a flowchart representing a process for playing back a stored sequence.

10 Fig. 7 shows a flowchart representing a process for storing and playing back a sequence that includes interkey time delays.

Figs. 8(a)-8(g) depict a key sequence table, similar to that shown in Fig. 5, changing as sequence values, including interkey values, are stored in the key sequence table.

15 Fig. 9 shows a flowchart representing a process for playing back a stored sequence having interkey time delay values.

20 Fig. 10 shows a flowchart representing a process for implementing a so called quick macro.

Fig. 11 shows a remote control capable of displaying at least one menu on a display screen.

25 Fig. 12 shows an example of a DVD menu tree.

5 Fig. 13 shows a remote control displaying menu pages corresponding to pages of the
tree depicted in Fig. 12.

Fig. 14 shows a remote control having menus displaying graphics along with text.

10 **DESCRIPTION OF EXEMPLARY EMBODIMENTS**

The present invention is discussed in relation to digital video discs (DVDs) and, in particular, to a remote control navigating material initially provided on a DVD, other uses will be apparent from the teachings disclosed herein. The present invention will be better understood from the following detailed description of exemplary embodiments with reference to the attached drawings, wherein like reference numerals and characters refer to
15 like parts, and by reference to the following claims.

Fig. 1 shows an exemplary consumer electronic system 10 according to the present invention. The system 10 includes a consumer electronic device 12, which is a DVD player
20 13 in a preferred embodiment. Other devices operable with removable digital media are envisioned as being within the scope of the invention. Accordingly, the system preferably includes at least one removable digital medium. In the system 10 shown in Fig. 1 the consumer electronic device 12 is adapted to operate with a digital video disc 14 or a digital memory card 16.

5 The digital memory card may be a secure memory card such as may be obtained from Matsushita Electronic Industrial, also known as Panasonic, SanDisc, or Toshiba Corporation or other types known in the art. In one embodiment the secure digital memory card (SD memory card) is approximately 24 mm by 32 mm by 2.1 mm 9 pins. It has a capacity from 32 MB (megabytes) to 250 MB. Generally SD memory cards or memory sticks may be rated
10 at different respective sizes, e.g., from 2 MB to 10 MB. Preferably, the SD card is SDMI (Secure Digital Music) compliant.

 The system 10 also includes a control module 20 which in the preferred embodiment is a hand-held remote control 21. The remote control 21 includes navigation keys 22. In an
15 alternative embodiment the navigation keys 22 may be integral navigation keys 22'. In Fig. 1 the integral navigation keys 22' are integral with the player 13.

 Fig. 2 shows an enlarged view of some of the navigation keys of remote control 21, including MENU key 24, SELECT key 26, and the four directional keys 28, 30, 32, and 34.
20 Fig. 2 also shows the JUMP key 36.

 The remote control 21, preferably includes mode keys 38 for allowing the remote control to change, in the embodiment shown in Fig. 1, between DVD, VCR, TV and cable modes. Remote control 21 generally includes standard keys such as volume key 40 and
25 channel key 42. Digit keys 44 provide for direct entry and numeric response to queries

5 which so require. The remote control 21 is also generally provided with a power key 46 and set up means, such as programming initiated with set up key 48.

It is desirable to provide the remote control 21 with additional navigation keys such as a GUIDE key 50, an INFO key 52, PAGE UP and PAGE DOWN keys 54, 56, and an
10 EXIT key 58. Preferably the remote control 21 is provided with, so called “quick macro” keys “LAST” 60 and “DO” 62 which will be described in further detail below.

Fig. 3 shows a flowchart 66 representing the basic logic, of one preferred embodiment, that may be carried out every time a key press of the remote control 21 is
15 detected (step 70). Flowchart 68 of Fig. 4, which is discussed in more detail below, represents one method of storing a key’s value.

In one embodiment, the remote control 21 checks to see if the key pressed is the JUMP key 36, i.e, remote control 21 monitors key activation. If the JUMP key is activated,
20 the remote control 21 initiates (at step 72) playback of the currently stored sequence of the Menu navigation key presses. This will be described in more detail in conjunction with Fig. 6.

If the key activated is not the JUMP key, the remote control 21 then determines if its
25 current mode setting is “DVD,” for example. If not DVD mode, the user interface, e.g., the remote control 21, bypasses any further checking and performs the key function in the usual

5 manner. This process ensures that only menu and navigation key presses applicable to control of the desired digital player device (i.e., the DVD player) are captured. (If the remote in question were a “single mode” or “modeless” unit, i.e. capable of controlling only the DVD player, for example, this step may easily be omitted.)

10 If the remote control 21 is in DVD mode, the remote 21 then checks to see if the activated key is the menu function (or MENU key) 24. If the MENU key 24 is pressed, one may assume this action to be the start of a new series (new sequence) of menu navigation keystrokes by the user. The sequence storage (e.g., sequence table 81) is then set to “empty” by setting the “IN” pointer 90 equal to the “OUT” pointer 92. Other methods of clearing the
15 key sequence memory will be apparent. (The functioning and description of the IN and OUT pointers will be described in more detail in conjunction with Figs. 4 and 5 below.) Note that in the process set forth in Fig. 3, the MENU key 24 is not stored in the sequence table 81. This is advantageous if MENU key 24 is always the start of a new navigation sequence. Thus, one need not use memory space to store the MENU key 24. In other implementations,
20 there may be more than one key which initiates entry into a menu system (e.g., “GUIDE,” “INFO” etc., used alone or in conjunction with a “MENU” button, and so forth) in which case the initiating key function should be stored as well for playback.

The remote 21 determines whether the key pressed is one of the set of functions
25 associated with the menu navigation (up, down, left, right, select and play in this example) at step 74. If the key pressed is a navigation key, the remote 21 stores the key value into the

5 sequence table 81 at step 76, if a navigation key was not pressed, the storage step is bypassed. This filtering means may occur when the values are being loaded into memory, or upon execution of the stored sequence. The storage process is discussed more fully below with reference to Figs. 4 and 5.

10 In a preferred embodiment, the remote 21, at step 78, completes the processing and sends the transmitted, preferably IR, function corresponding to that pressed key. RF technology and or communication techniques are also compatible with the inventor.

15 Figs. 4 and 5 depict the process for saving a sequence of menu navigation keystrokes 80 (see Fig. 5d). Fig. 4 shows a flowchart 68 representing how data is entered into the sequence table 81 using the IN pointer. First the IN pointer 90 (see Fig. 5) at step 94 is checked against a maximum predetermined value. This is one method of preventing overflow of table data into areas of memory allocated to other remote control functions. Other methods safeguarding memory will be apparent to those of skill in the art. Without
20 this safeguard, such an overflow could, for example, be created by a user idly jiggling one of the navigation keys while not actually using the DVD device. The maximum IN limit can be set to any value compatible with the aforementioned goal of memory protection. However, for practical purposes, a number on the order of 32 is expected to be more than adequate.

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5 If the maximum IN value has not been reached, the remote 21 simply stores the current key value at the location indicated by the IN pointer 90 increments the IN pointer 90 to point to the next available location (see Figs. 5(a)-5(d)) and returns to the main routine.

Referring to Fig. 5, one method of storing the navigation sequence is by controlling
10 two pointers to a table space in memory, e.g., the sequence table 81. The pointers are labeled IN 90 and OUT 92. The IN pointer 90 indicates where the next keystroke to be stored will be placed, while the OUT pointer 92 indicates where playback of a key sequence will begin. During entry of data into the table 81, the OUT pointer 92 never changes. (Conversely, during retrieval of data from the table 81, the IN pointer 90 never changes.)
15 Other methods of storage will be apparent to those of skill in the art from the teachings disclosed herein. Figs. 5(a)-5(d) show the progression of table data contents and pointers as a sequence of keystrokes "DOWN ARROW," "RIGHT ARROW," and "SELECT" are stored.

20 Fig. 6 shows a playback logic flowchart 100 representing a method to effect playback of the stored keystrokes 82 once the JUMP key 36 is activated. (More generally, a sequence may be stored between a first predetermined key and a second predetermined key, and playback initiated by a third predetermined key.) First the remote control 21 checks to see if it is currently in the applicable mode, e.g., DVD mode. If not, it switches to that mode
25 (i.e., the JUMP key 36 effects control of the DVD device regardless of the current mode of the remote control 21.) In the playback implementation shown in flowchart 100, the remote

5 control 21 automatically sends the implied "MENU" command (because the MENU command was not stored to save memory).

10 The logic then checks to see if the OUT pointer 92 equals the IN pointer 90. When the keystroke storage table (the sequence table) 81 is empty, the OUT pointer 92 equals the IN pointer 90. A sequence table 81 that is empty is shown in Fig. 5(a). If the OUT pointer 92 equals the IN pointer 90, the remote control 21 then preferably exits the DVD menu mode. Though the menu mode has been exited, the secondary material is still accessible. This is particularly so when, for example, the menu system was navigated to add an alternative viewing angle, or show special effects features, etc. along with play of the primary material.

15

In this embodiment pressing the JUMP key 36 when no key sequence has been stored is the equivalent of, or results in the same effect as, pressing the "MENU" key 24. That is the menu screen is displayed upon activation of JUMP key 36.

20

If the OUT pointer 92 does not match the IN pointer 90, the key data at the location corresponding to the OUT pointer 92 is retrieved, and then the corresponding IR command is transmitted. Programming then increments the OUT pointer value and repeats the OUT = IN? test. If OUT and IN are not equal, the control module continues to repeat the retrieve and transmit sequence until the OUT=IN? test is true. Alternative methods of changing and

25

5 comparing pointer values is acceptable. More generally still, other methods of key storage and retrieval are acceptable and within the scope of the invention described herein.

When the two pointers are equal after the key sequence has been transmitted, the sequence playback is complete and the unit 21 resets the OUT pointer 92 back to its starting value (i.e., the unit 21 readies itself to play the same sequence back again if required) and then returns to the main routine. In this manner, one may navigate material, e.g., secondary material, to a desired screen. Intermediate screens may be displayed or the logic may allow the user to go directly to the desired screen.

15 In some applications, it is anticipated that the time interval between key presses may be significant, i.e., relevant to the menu selection, etc. For example, where a key press causes a sub-menu display to be initiated, and the target device must wait to recognize a subsequent selection key press until the sub-menu display is ready. In these and other cases, it is advantageous to store not only key press values, but also the elapsed time between the key presses and then replicate these pauses during playback -- i.e., a "real time" playback. Figs. 7-9 show an alternative approach for storing and playing back key sequences. The methods discussed in reference to Figs. 7-9 account for an interkey pause sequence 82 (see Fig. 8), or a sequence having an interkey pause time. For comparison and clarity, Figs. 7-9 show how this feature can be implemented by modification of the routines shown in Figs. 25 3-6.

5 Fig. 7 depicts a flowchart 120 representing a process for interkey delay storage. The flowchart 120 is modification of the routine shown in Fig. 3. Flowchart 120 is modified to include capture and storage of the interkey pause time 84 (see Figs. 8(c) and 8(g)). The initial selection process (e.g., determining whether a key press is a DVD menu navigation key) and storage of the key press value remains similar. However, after transmitting the key
10 function, the remote 21 remains active to measure the elapsed time between this keystroke and the next. When the next key press in a sequence is detected, or if a predetermined maximum time has elapsed (e.g., 5 seconds), the remote 21 times the value and stores it as a second entry into the sequence table 81 (see Fig. 8(g)).

15 Fig. 8 shows this time delay storage process in more detail regarding the sequence storage table 81. The same sequence of keystrokes in Fig. 5 is used. Playback of such a sequence of interleaved key values and delay times is shown in flowchart 130 of Fig. 9. Note that the delay time saved after the final key press need not be implemented.

20 The embodiments described above offers the user a convenient way to, among other features, repeat a sequence, preferably the last sequence, of keystrokes applicable to a particular sub-set of keys on a user interface. Features such as the “user macro” described in U.S. Patent No. 5,959,751 allow the user to program often-used fixed sequences of keystrokes for controlling hardware, e.g., controlling the player vice accessing the storage
25 medium, on a semi-permanent basis.

5 Another desirable feature would be a sequence definition process that falls somewhere between the “fully automatic,” and filter capable, systems described in the above embodiments and the semi-permanent system described in U.S. Pat. ‘751. An objective is to allow the user to very quickly program and use a sequence of keystrokes of short-term usefulness, for example, for the duration of a show or sports event or portion of the video.

10 This may be particularly useful in reviewing secondary material where one may want to see the same scenes multiple times from different angles, rather than watch the scenes simply play out. Further, this “DO” feature can be implemented as a sub set of the JUMP feature wherein the DO key sequence is not stored as part of the JUMP sequence.

15 One method of implementing a DO feature is represented by Flowchart 140 of Fig. 10 with the DO key, number 62 shown in Fig. 1. In general, if the user presses and holds this special, or predetermined key (DO key 62), the remote 21 will memorize all other keystrokes entered while DO is held down. If, however, the user presses and releases DO with no intervening input of other keys, the remote 21 will play back the last-entered DO sequence.

20 Other variations on this exemplary process will be apparent from the teachings disclosed herein.

Fig. 10 shows Flowchart 140 setting forth an embodiment of the above-described process. When the DO key 62 is initially pressed, the remote 21 enters a state where it

25 monitors the other keys on the unit, storing key values into a DO table for as long as the DO key remains depressed, i.e., adding keys to the DO sequence table. Storage of key values

5 may be performed in exactly the same ways as previously described in conjunction with Figs.
4 and 5, except, perhaps to a second storage location independent of any jump key sequence
that may exist. This provides for both JUMP and DO features. (When the DO key 62 is
released, the remote 21 will then play back the storage sequence of keystrokes.) In the
implementation shown in Fig. 10, it may be noted that the key sequence entered is played
10 back immediately after entry, by way of confirmation. It will be appreciated that minor
changes in logic can be made to effect playback of the sequence only on subsequent presses
of the DO key 62. Also, the capture of inter-key timings can be included if desired, in a
manner similar to that described above in conjunction with Figs. 7-9.

15 In another embodiment, the user interface, e.g., a control module 20, reads at least
one menu from the material provided on the removable digital medium 14 and stores the at
least one menu in memory. In a preferred variation of this embodiment, the at least one
menu is displayed on the control module 20. Fig 11 shows a remote control 150 capable of
displaying the at least one menu on a display screen 152. In a preferred embodiment, the
20 display screen 152 is an LCD screen. The display screen 152, preferably via a touch screen,
provides access to secondary material, such as special effects (F/X), different angle views
(ANGLE), multiple angle views (Multi/Angle), and other such material as discussed
previously.

25 In yet another embodiment, the remote control unit includes a larger LCD capable of
displaying the menu graphic(s) and/or buttons as defined by the material provided on the

removable digital medium and transmitted to the remote by the player hardware. If this LCD is also equipped with touch screen capability, the arrow keys may be dispensed with as the remote can automatically generate the appropriate sequence of navigation keystrokes followed by a “select” command in response to a single touch by the user on the desired choice. Alternatively, the remote can send just an “x-y” coordinate for the button touched and the player hardware can decode this to the appropriate function command.

Fig. 12 depicts how a typical DVD menu tree 160 may be arranged in terms of the choices 162-174 offered the viewer. In a conventional system, these would be displayed on the TV screen and navigated using the directional keys on the remote control. However, an alternative approach on DVD players equipped to communicate with a two-way capable remote control including a touch screen LCD display might be to present the menu choices as a series of displays, e.g., 164-168, on the remote control itself. Selection is performed by the user touching the desired choice.

Figs. 13 and 14 show how such an application including a display menu may appear. Fig. 13 shows a remote control 180 having a touch screen display 182. The first two menu pages 162 and 164 of the tree 160 are shown in Fig. 12 as these might appear in a “text only” format. Text screen 164 may be obtained by touching heading 184 (“scene selection”) on display 162. Fig. 14 shows portions 190 and 192 of a different menu tree which in this case includes black and white graphics 194-202 which are downloaded to the remote 180 to enhance the menu display appearance.

5 From the foregoing it will be apparent that a primary aspect of the invention is directed toward an improved remote control characterized in that the user interface is enhanced. In one embodiment, the enhancement is achieved by improving the navigation system. In one aspect, the navigation system is improved through use of means for accessing desired media in an expeditious manner. In another embodiment, the user interface is improved through an improved menu display. In a particular embodiment, the navigation system is enhanced through use of an improved display screen.

15 Accordingly, another aspect of the invention is directed toward means for achieving such user interface enhancements. In a particular embodiment, a microcontroller (a microprocess combined with memory) is provided with the interface enhancement means.

20 While the invention has been particularly shown and described with reference to particular embodiments thereof, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

CLAIMS

The invention claimed is:

1. A consumer electronic system comprising:

a consumer electronic device operable with a removable digital medium having a menu system stored thereon;

10 a control module having navigation keys operable in connection with the consumer electronic device for navigating the menu system when the digital medium is operating with the consumer electronic device, wherein the control module further includes

15 means for storing a sequence of navigation keystrokes of at least two of the navigation keys, and

means for repeating the sequence of navigation keystrokes with fewer keystrokes than the sequence contains.

20 2. The system of claim 1, wherein the means for storing and repeating the sequence comprises programming stored in the control module.

3. The system of claim 1, wherein the means for repeating the sequence comprises means for repeating the sequence upon execution of a single key.

5 4. The system of claim 1, wherein the means for storing the sequence comprises means
for storing the sequence between operation of a first predetermined key and a second
predetermined key.

10 5. The system of claim 4, wherein the second predetermined key is the same as the first
predetermined key.

6. The system of claim 5, comprising means for filtering non-navigation keystrokes.

15 7. The system of claim 1, comprising means for filtering non-navigation keystrokes.

8. The system of claim 1, wherein the control module is integral with the consumer
electronic device.

20 9. The system of claim 1, wherein the control module is a remote control.

10. The system of claim 9, wherein the removable digital medium is a digital video disc
(DVD) and the consumer electronic device is a DVD player.

25 11. The system of claim 10, comprising means for filtering non-navigational keystrokes
and wherein the means for repeating the navigation keystrokes sequence comprises means
for repeating the sequence upon execution of a single key.

5 12. A remote control operable with a consumer electronic device, the remote control comprising:

 navigation keys for navigating media stored on the digital medium;
 storage means for storing a sequence of navigation keystrokes; and
 means for repeating the stored sequence.

10

13. The remote control of claim 12, comprising means for filtering non-navigation keystrokes.

14. The remote control of claim 12, wherein the storage means comprises means for
15 storing inter-key pause times.

15. A remote control operable with a consumer electronic system having a consumer electronic device and a removable digital medium operable with the consumer electronic device, the medium including a menu system, the remote control comprising:

20 a plurality of keys including navigation keys for navigating the menu system;
 a transmitter providing communication with consumer electronic device in response to activation of at least one of the keys;

 means for storing a sequence of navigation keystrokes for navigating the menu system; and

25 means for executing the sequence with less keystrokes than contained in the navigation keystrokes.

5 16. The remote control of claim 15, comprising means for filtering non-navigational
keystrokes.

17. The remote control of claim 15, wherein the means for storing the sequence of
navigation keystrokes comprises means for storing inter-key pause timing.

10

18. The remote control of claim 15, wherein the means for executing the sequence
comprises means for executing the sequence with a single keystroke.

15

19. The remote control of claim 18, wherein the single keystroke is predetermined and
the means for storing comprises means for filtering non-navigational keystrokes.

20. A readable medium having instructions for of navigating secondary material provided
on a removable digital medium, the instructions performing steps comprising:

storing a sequence of navigation keystrokes the navigation keystrokes used

20

to navigate the secondary material; and

executing the stores sequence with fewer keystrokes than contained in the
sequence, wherein the secondary material is navigated.

25

21. The medium of claim 20, comprising the step of activating the keys to navigate the
secondary material to a desired screen, and wherein the step of executing the stored sequence
results in the arrival at the desired screen.

5 22. The medium of claim 21, wherein the step of navigating the secondary material to the
desired screen comprises displaying each screen displayed during the step of initially
navigating the secondary material to the desired screen.

10 23. The medium of claim 21, wherein the step of navigating the secondary material to the
desired screen comprises the step of by-passing screens to arrive at the desired screen.

24. The medium of claim 20, comprising instructions for controlling display of primary
material provided on the removable digital medium.

15 25. The medium of claim 20, comprising instructions for:
controlling a consumer electronic device to allow the consumer electronic
device to access the removable digital medium.

20 26. The medium of claim 20, comprising instructions for the step of filtering non-
navigational keystrokes.

27. The medium of claim 20, comprising instructions for storing inter-key pause timing.

25 28. The medium of claim 20, comprising instructions for identifying the start and end
points of the sequence.

5 29. The medium of claim 20, wherein the step of executing the stored sequence comprises the step of repeating the sequence with a single keystroke.

30. The medium of claim 20, comprising instructions for avoiding memory overflow problems.

10

31. The medium of claim 20, wherein the instructions reside in a remote control operable with a digital video disc (DVD) player, the removable digital medium is a DVD; and the medium comprises instructions for determining if the remote control is in DVD mode.

15 32. The medium of claim 31, comprising instructions for placing the remote control in the DVD mode in connection with executing the stored sequence.

33. The medium of claim 32, comprising instructions for performing the step of executing and placing in response to operation of a single key.

20

34. The medium of claim 20, wherein the step of storing the sequence occurs in response to activating a predetermined key while executing the sequence.

25 35. The medium of claim 34, comprising instructions for executing the stored sequence in response to activating the predetermined key.

5 36. A method of accessing material provided on a removable digital medium, installed
in a digital media player, the method comprising the steps of:

 storing steps for accessing desired material provided on the removable digital
 medium; and

 accessing the desired material with a reduced step process subsequent to the
10 step of storing steps for accessing the desired material, wherein the reduced step
 process contains fewer steps than the stored steps for accessing the desired material,
 whereby the desired material is assessed.

37. The method of claim 36, wherein the reduced step process comprises accessing the
15 desired material upon operation of a single key.

38. The method of claim 36, comprising the step of downloading the desired material to
the digital media player prior to accessing the desired material.

20

39. The method of claim 36, comprising the step of accessing the desired material via the
digital media player, wherein less than a substantial portion of the desired material is stored
in the digital media player.

25

5 40. The method of claim 36, wherein the control module integral with the digital media
player and the step of storing comprises operating the digital media player.

41. The method of claim 36, wherein the control module has remote control capability
to control the digital media player remotely and the method comprises the step of operating
10 the digital media player remotely.

42. A consumer electronic system comprising:
 a consumer electronic device;
 a user interface having navigation keys adapted to navigate a menu system of
15 a removable digital medium installed in the CED, the user interface having
 memory adapted to store a sequence comprising at least two
 navigation keystrokes, and
 programming for subsequently repeating the sequence with fewer
 keystrokes than the at least two navigation keystrokes, wherein the menu
20 system is navigated.

43. A remote control adapted for use with a removable medium having a menu system,
the remote control comprising:
 a display; and
25 a microprocessor connected to the display and adapted to define images on the
display based upon material in the menu system.

5 44. A remote control adapted for use with a media player using a menu system, the
remote control comprising:

 a bi-directional communication system;

 a processor connected to the communication system; and

 programming operable with the processor for defining navigation commands sent to
10 the player based upon data received from the player.

45. The remote control of claim 44, wherein the programming comprises instructions for
storing a sequence of commands for subsequent transmission to the player.

15 46. The remote control of claim 44, wherein the programming is adapted to process
preprogrammed sequences of data transmitted by the player.

47. The remote control of claim 44, wherein the programming is adapted to define a
plurality of keys based upon the data received from the player.

20 48. A remote control adapted for use with a consumer electronic device, the remote
control comprising:

 a bi-directional communication system including a receiver and a transmitter;

 a processor connected to the communication system;

25 a display connected to the processor; and

5 programming for defining keys on the display based upon data received from the consumer electronic device.

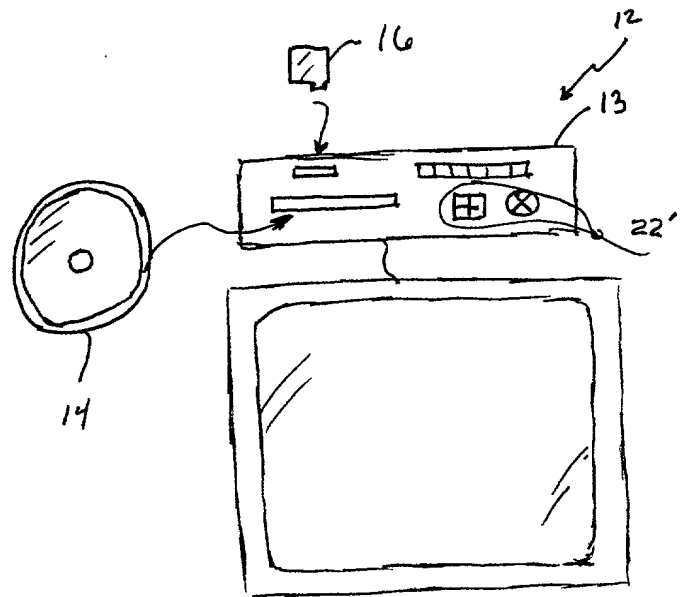
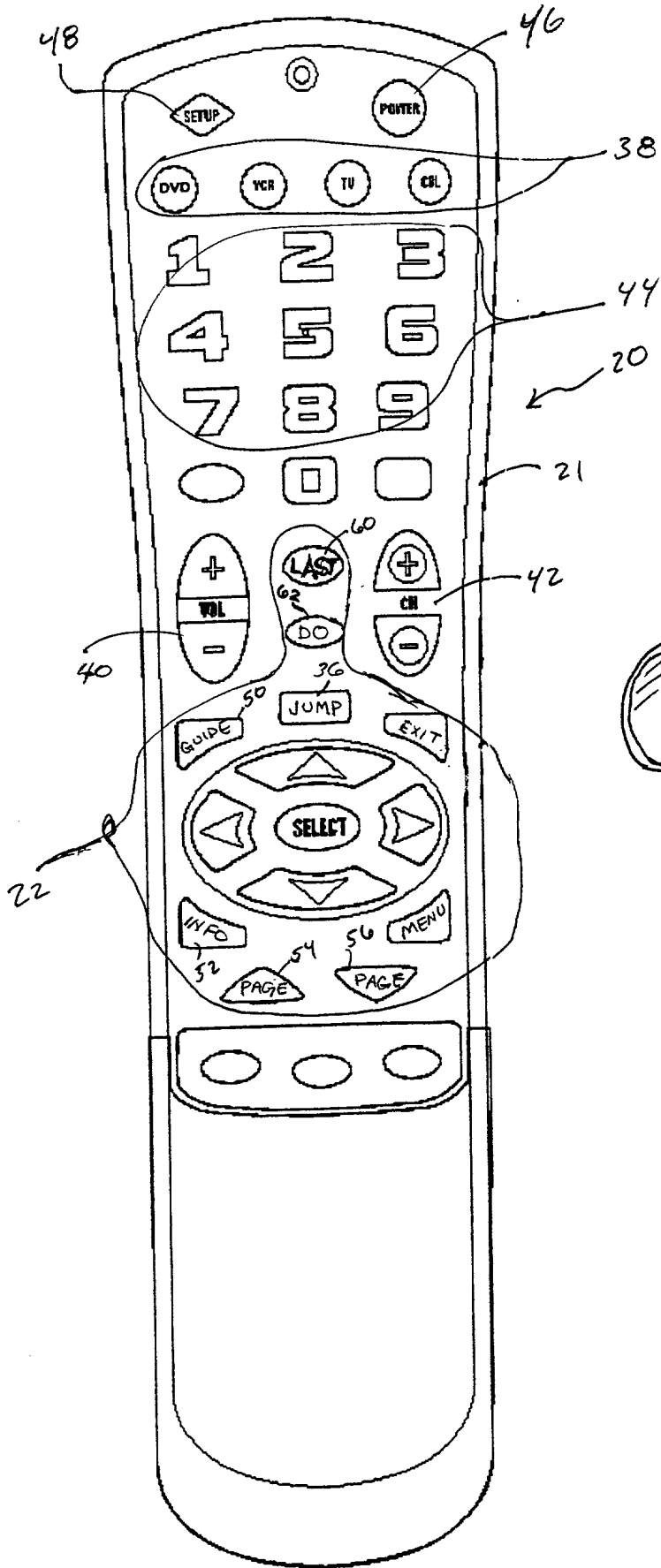
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ABSTRACT OF THE DISCLOSURE

A remote control having an improved user interface. A remote control for navigating a menu system provided on a digital video disc (DVD) is disclosed. The remote control comprises memory for storing a sequence of navigation keystrokes and programming for subsequently executing the sequence, whereby material on the DVD is navigated. Remote controls having a display screen are also used to enhance the user interface. More general systems and methods related to consumer electronics are also disclosed.

FIG. 1

10



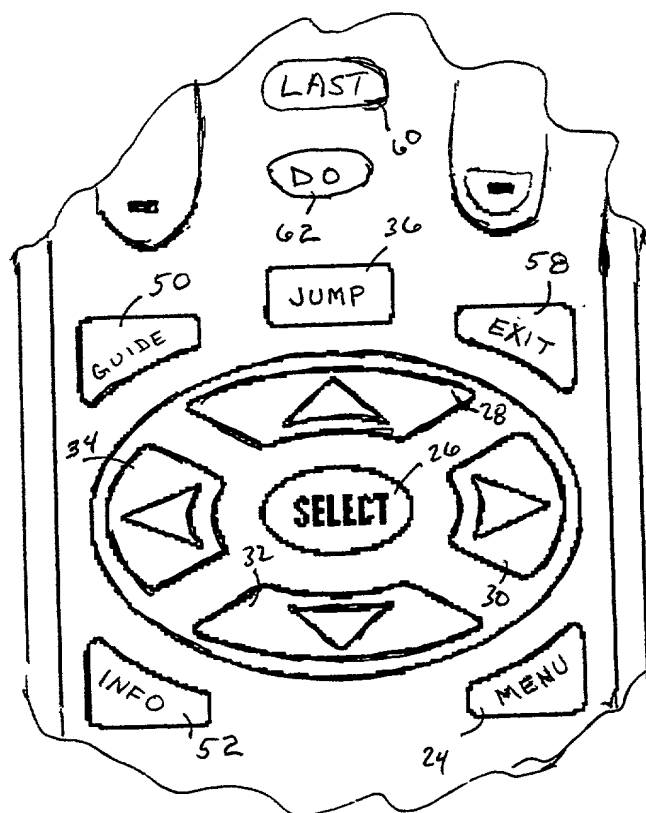


FIG. 2

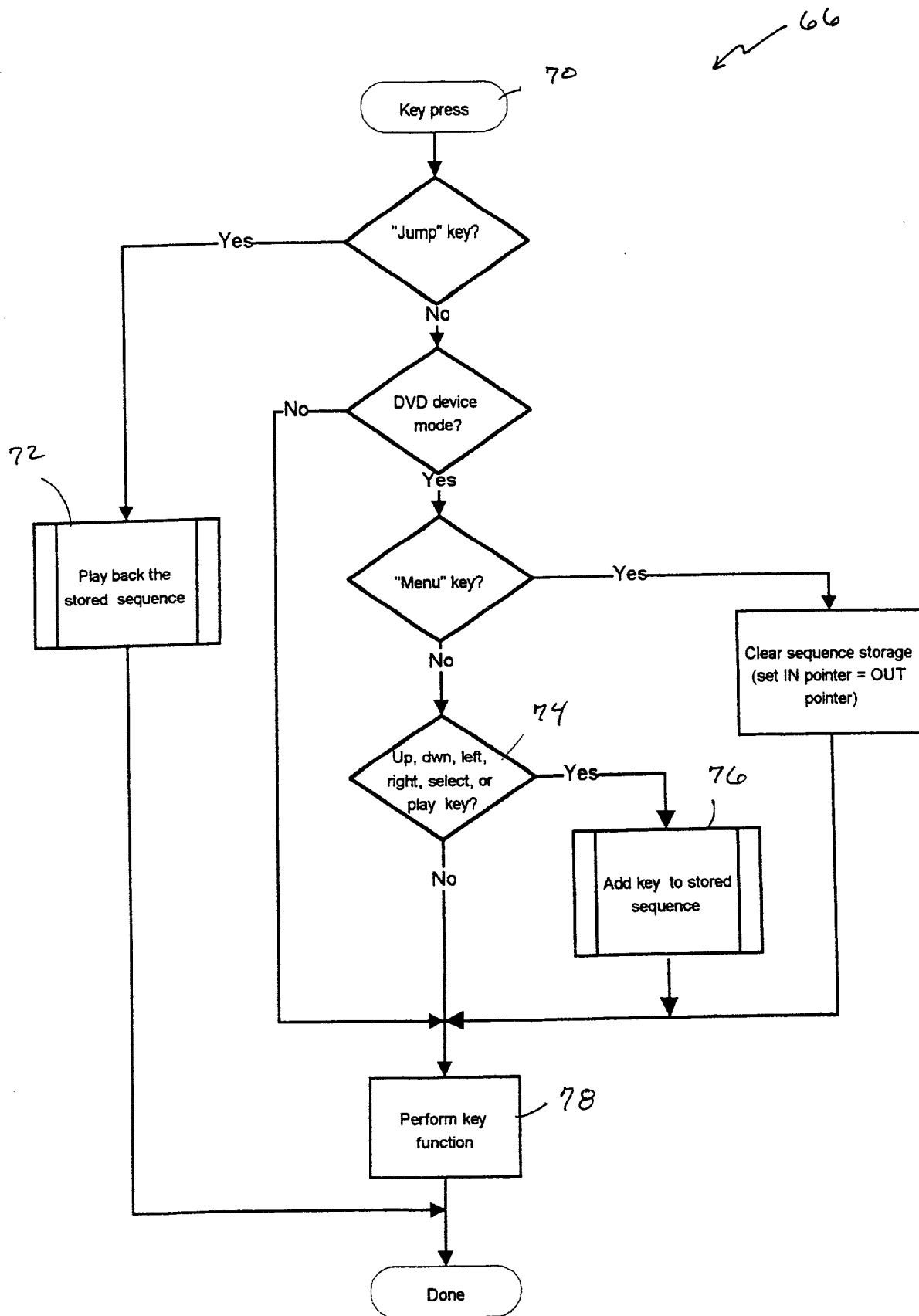


FIG. 3. BASIC KEY PROCESSING

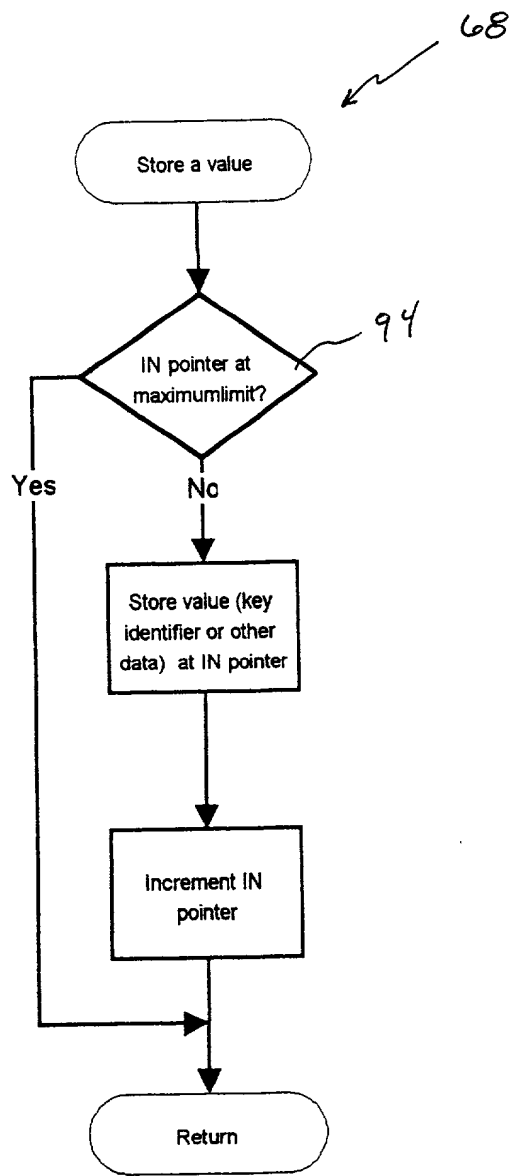


FIG. 4. ADD A VALUE TO STORED SEQUENCE

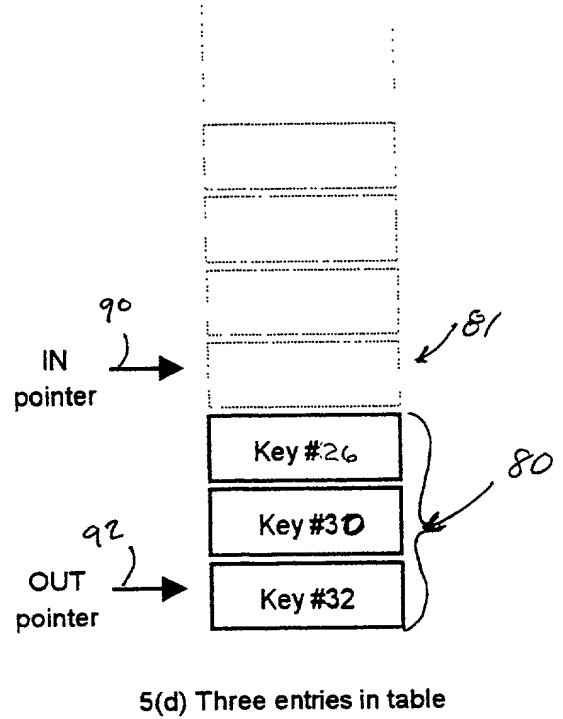
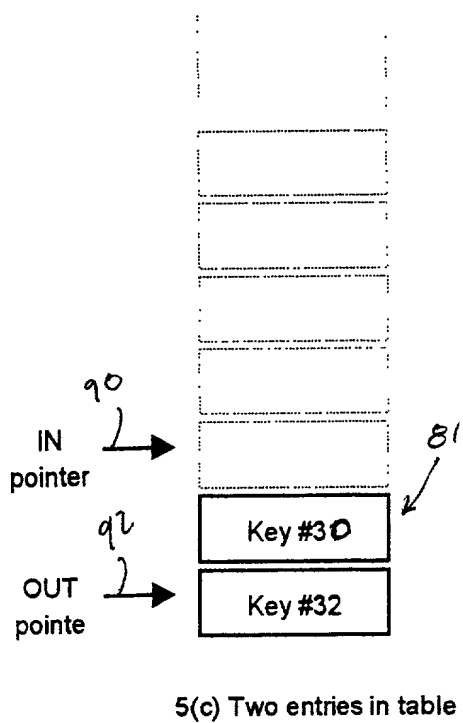
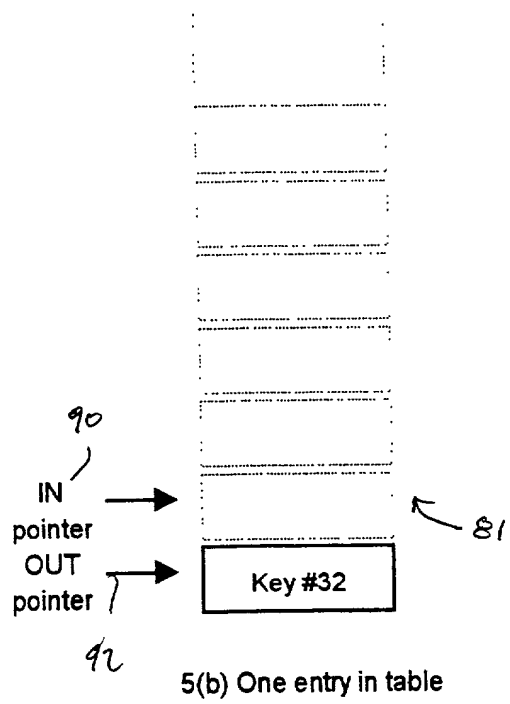
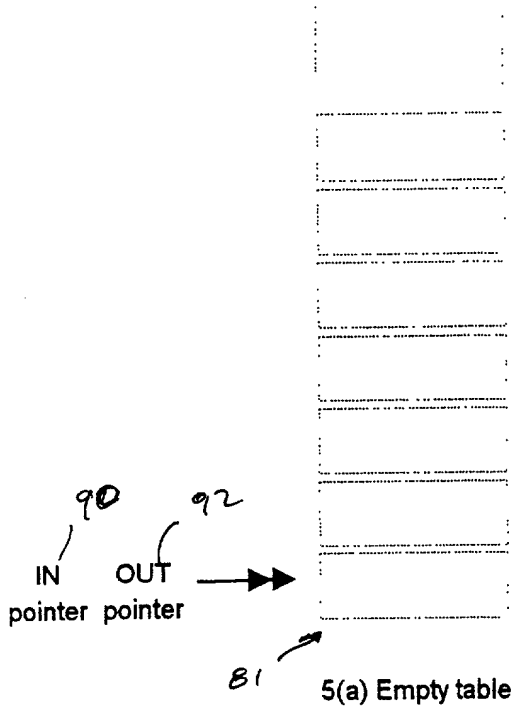


FIG. 5. KEY SEQUENCE STORAGE

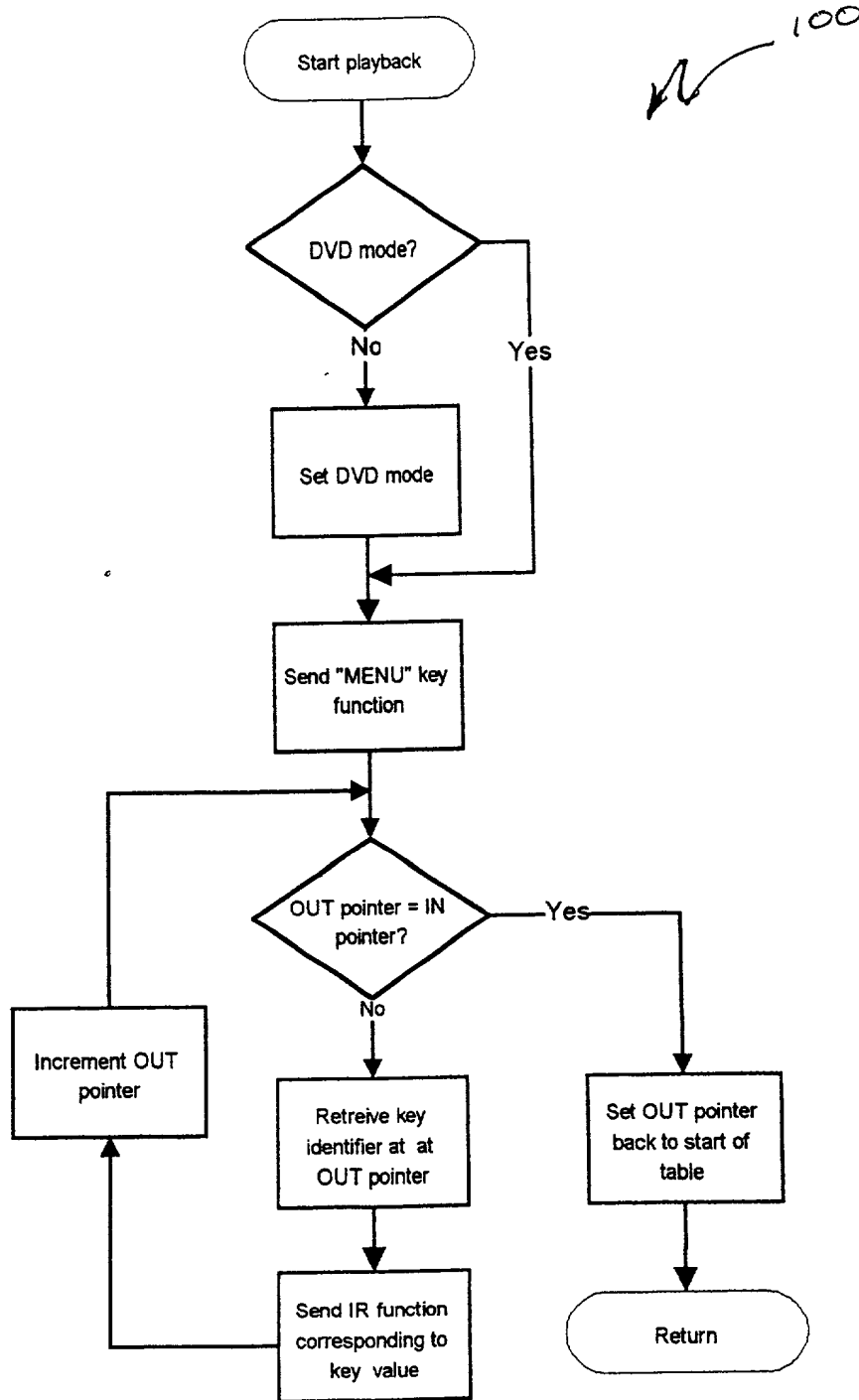


FIG. 6. PLAYBACK
A STORED SEQUENCE

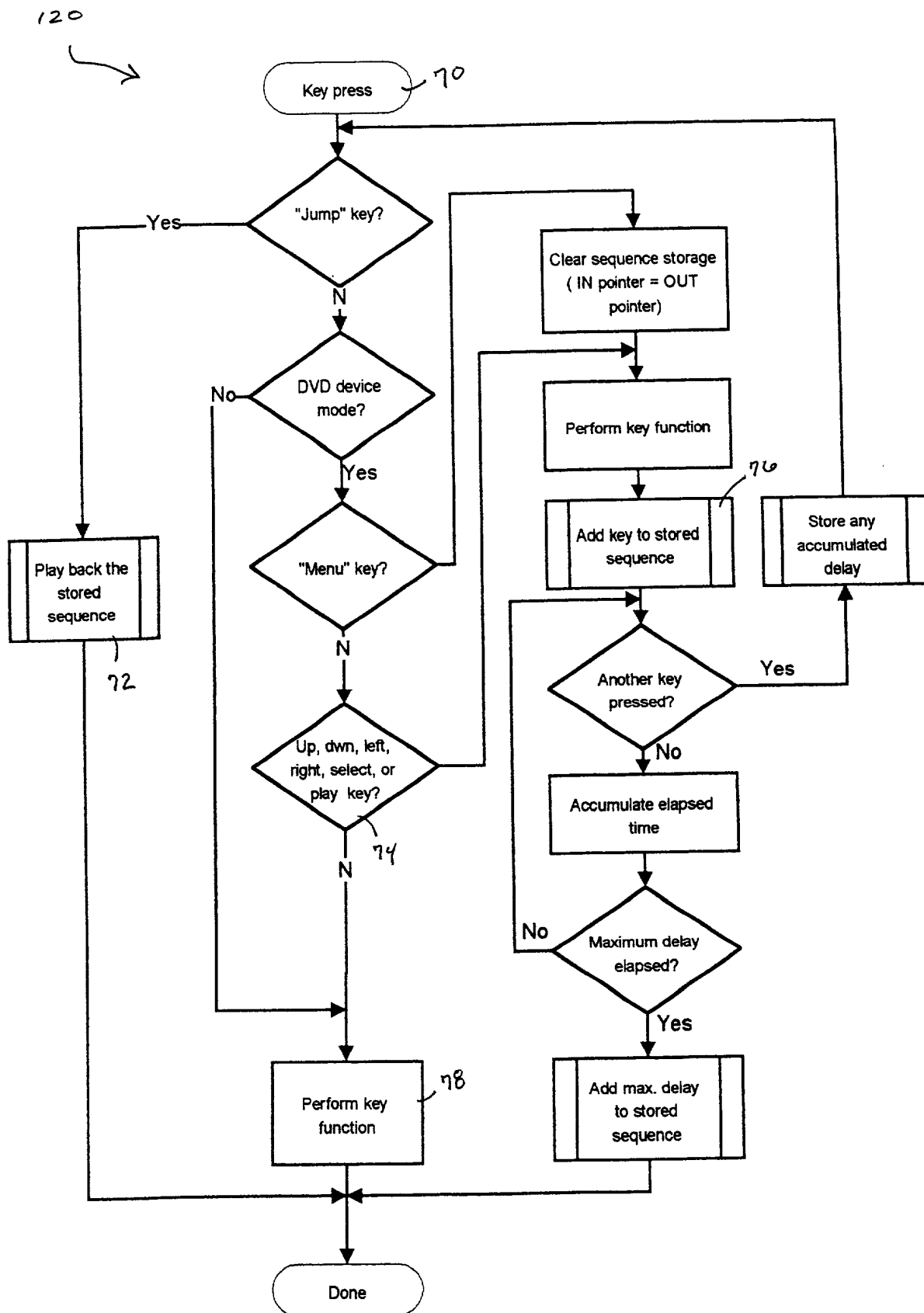


FIG. 7. BASIC KEY PROCESSING WITH INTER-KEY DELAY MEASUREMENT

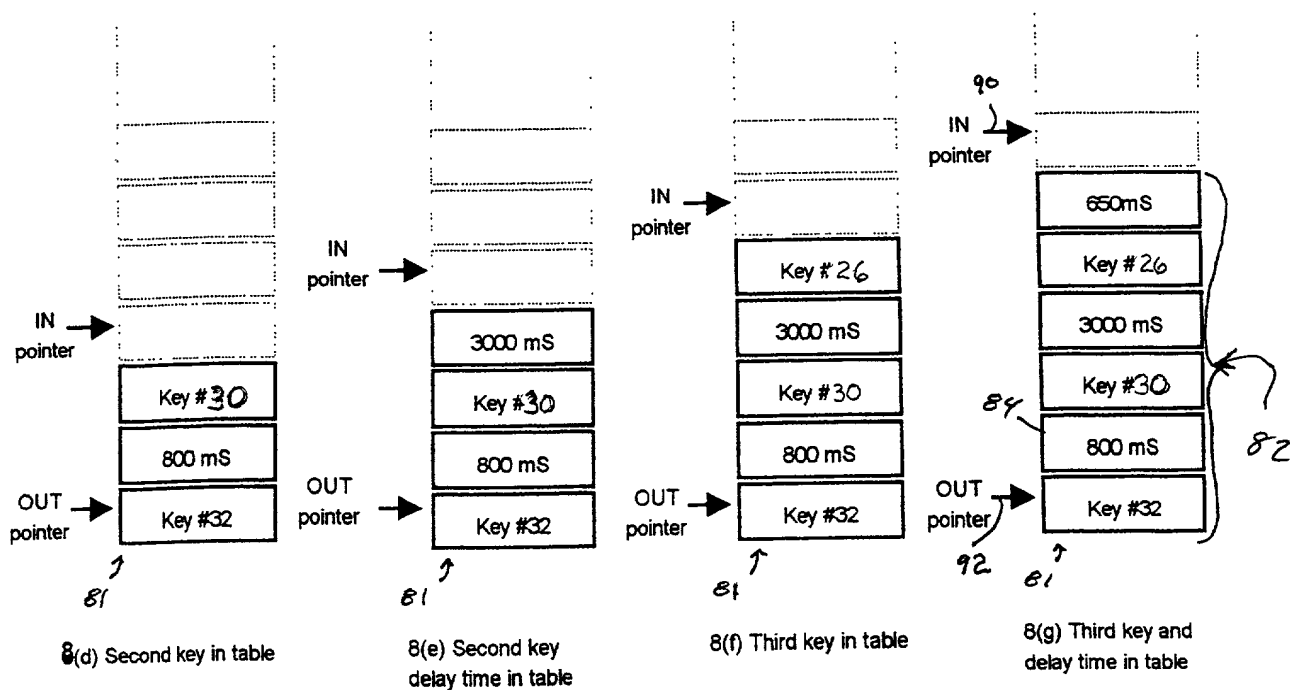
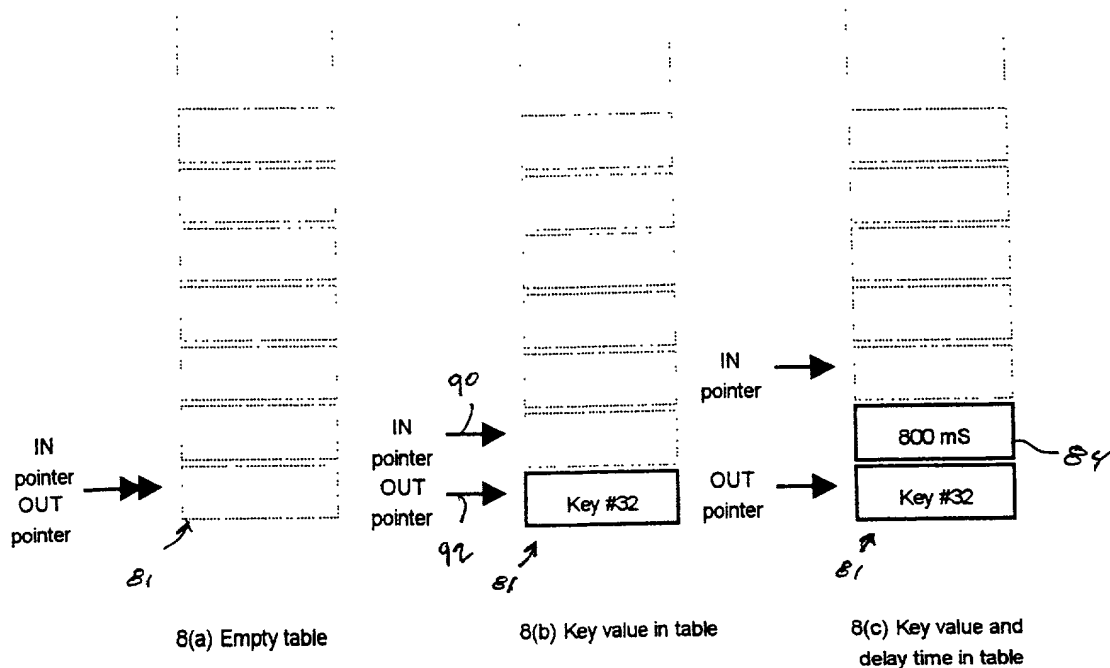


FIG. 8. KEY SEQUENCE STORAGE OF BOTH KEY VALUE AND DELAY TIME.

130

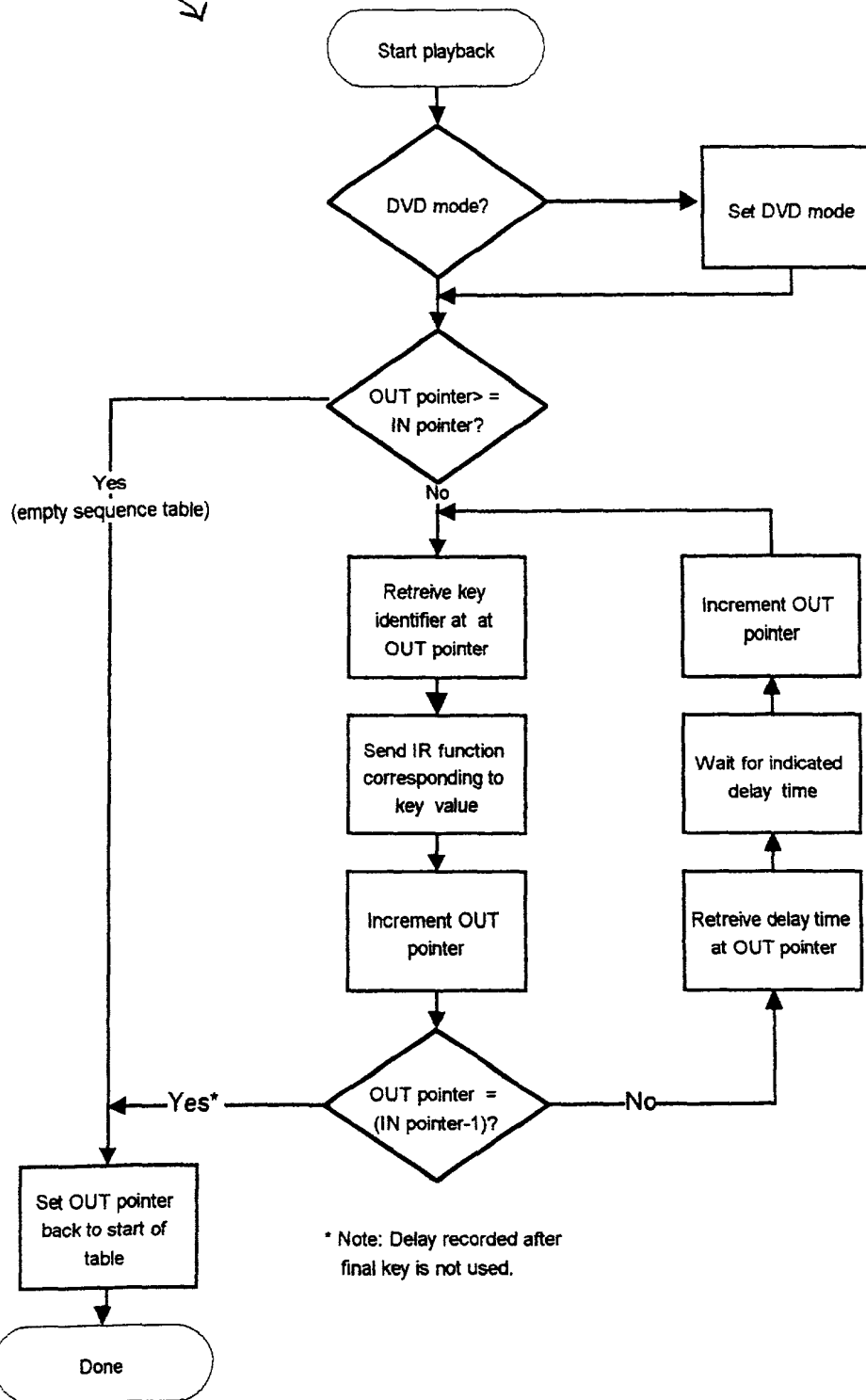
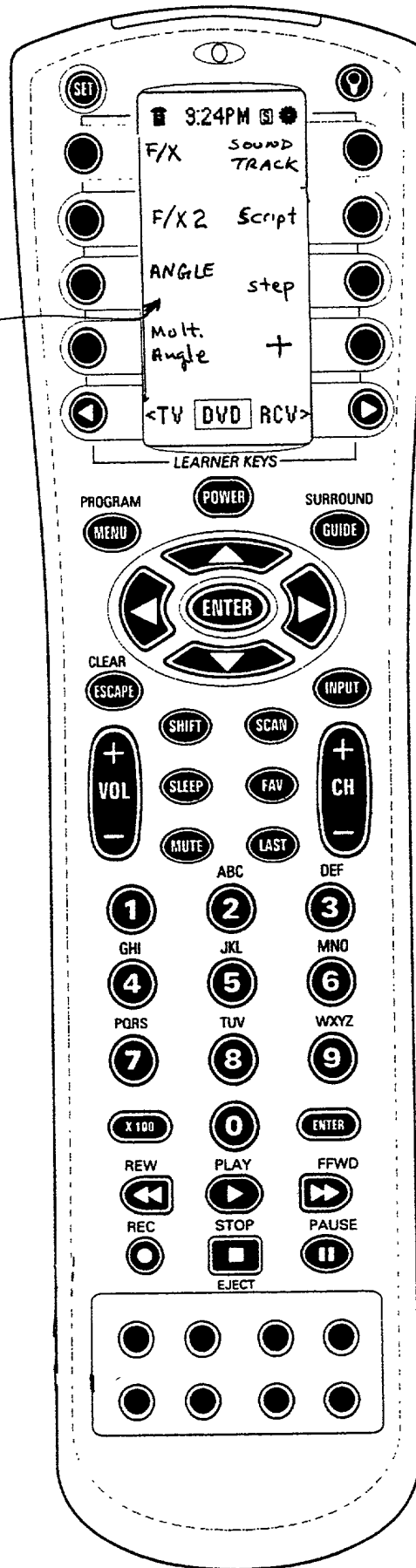


FIG. 9. PLAYBACK A STORED SEQUENCE WITH RECORDED DELAYS.

152



150

FIG. 11

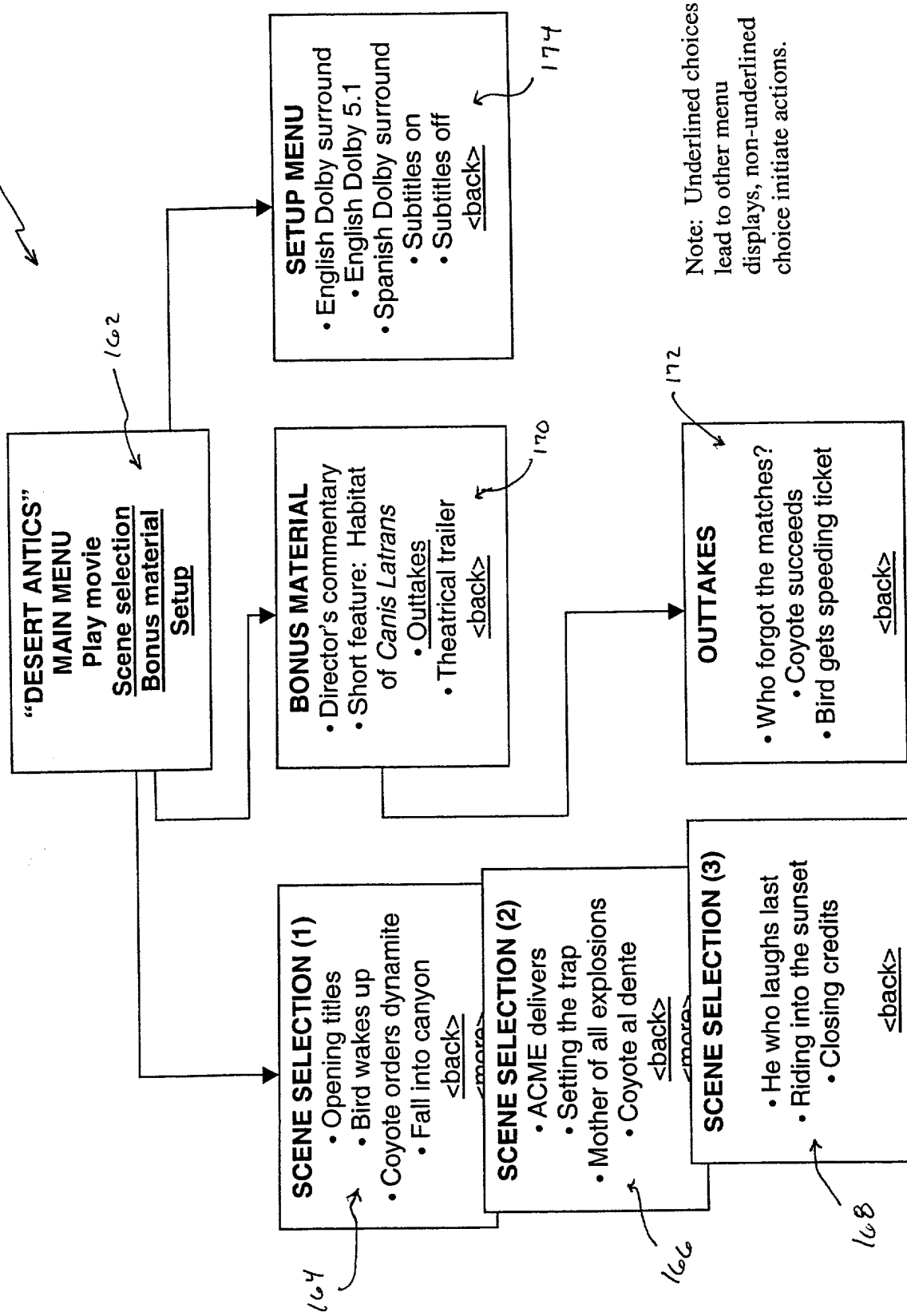


FIG. 12 : Example DVD Menu Tree

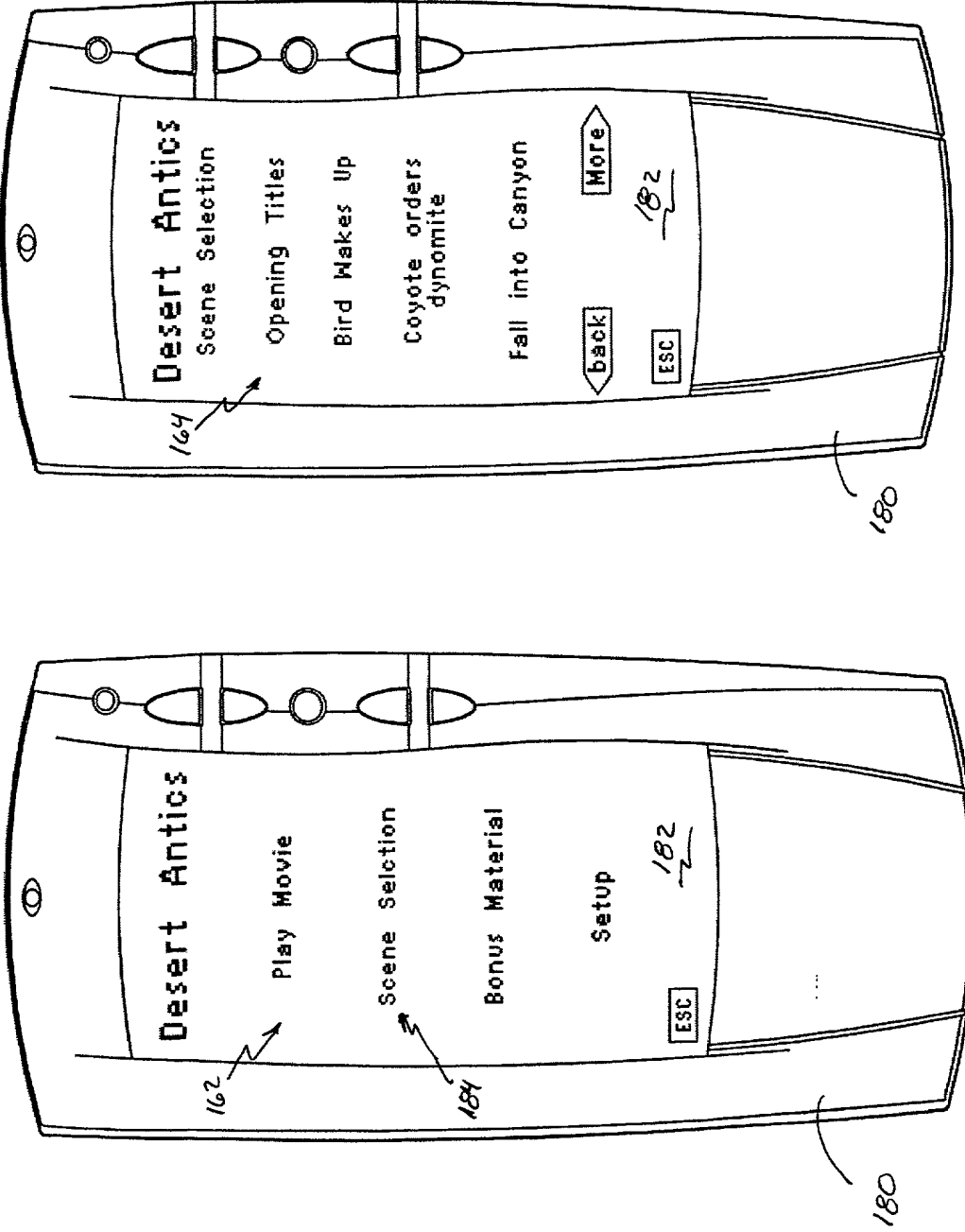


FIG. 13 : Menu selections presented on remote control

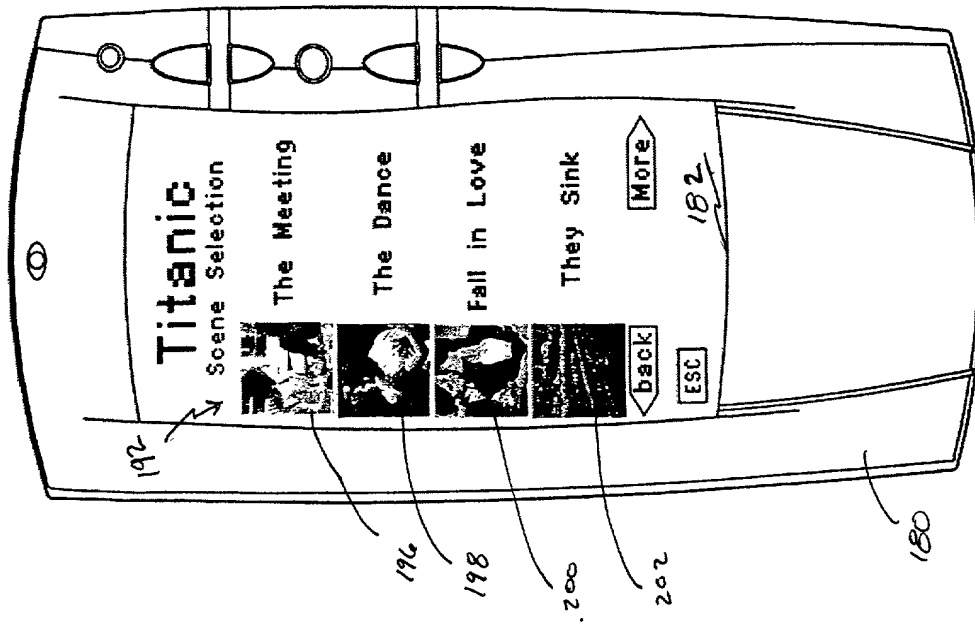
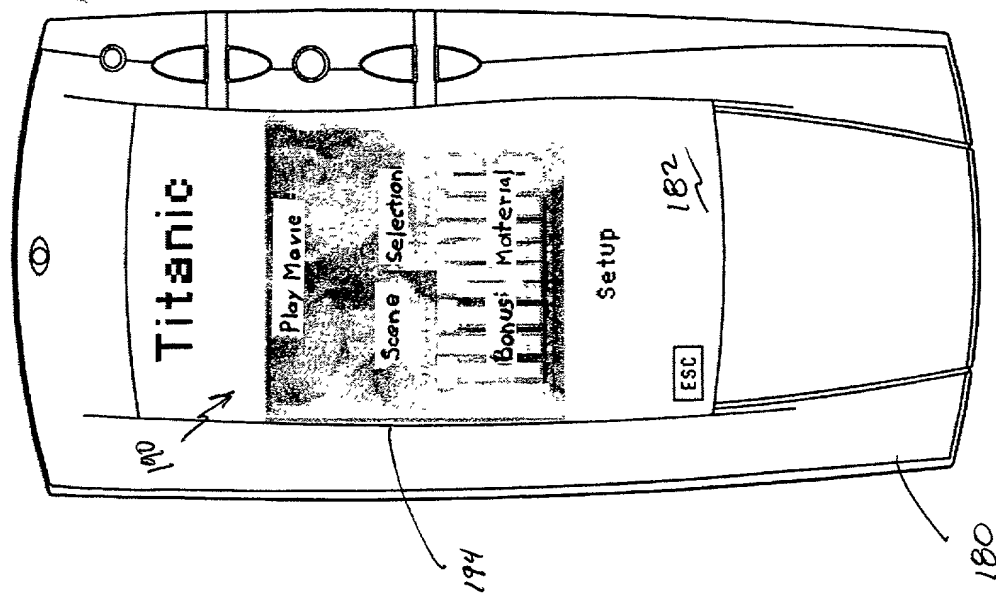


FIG. 14: Menu selections on remote control with graphics

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; that

I believe I am an original, joint inventor of the invention entitled "Consumer Electronic Navigation System and Methods Related Thereto" described and claimed in the attached specification.

I have reviewed and understand the contents of the specification, including the claims, in the above-referenced application, as amended by any amendment specifically referred to in the Declaration.

I acknowledge my duty pursuant to 37 C.F.R. §1.56 to disclose information of which I am aware which is material to the patentability of this application.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

None.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the

United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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Mark R. Galis	Reg. No.: 36,805
Gary R. Jarosik	Reg. No. 35,906
Michael G. Kelber	Reg. No.: 41,111
John E. Hyatt	Reg. No.: 43,421
Michael A. Carrillo	Reg. No.: 44,595

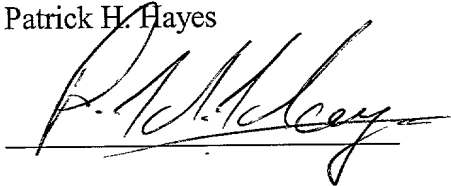
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Inventor's signature:



Date

JUNE 28 2000

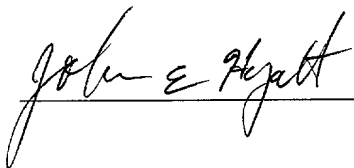
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June 29, 2000

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